1   1.   A method for optimizing a wireless electromagnetic communications network,

2   comprising:

3   a wireless electromagnetic communications network, comprising

4   a set of nodes, said set of nodes further comprising,

5   at least a first subset wherein each node is MIMO-capable,

6   comprising:

7   an antennae array of M antennae, where $M \geq$ one,

8   a transceiver for each antenna in said spatially diverse

9   antennae array,

10   means for digital signal processing to convert analog radio

11   signals into digital signals and digital signals into analog

12   radio signals,

13   means for coding and decoding data, symbols, and control

14   information into and from digital signals,

15   diversity capability means for transmission and reception of

16   said analog radio signals,

17   and,

18   means for input and output from and to a non-radio

19   interface for digital signals;

20   said set of nodes being deployed according to design rules that prefer

21   meeting the following criteria:

22   said set of nodes further comprising two or more proper subsets of

23   nodes, with a first proper subset being the transmit uplink / receive

24   downlink set, and a second proper subset being the transmit

25   downlink / receive uplink set;

26   each node in said set of nodes belonging to no more transmitting

27   uplink or receiving uplink subsets than it has diversity capability

28   means;

29   each node in a transmit uplink / receive downlink subset has no

30   more nodes with which it will hold time and frequency coincident

1

1   communications in its field of view, than it has diversity

2   capability;

3   each node in a transmit downlink / receive uplink subset has no

4   more nodes with which it will hold time and frequency coincident

5   communications in its field of view, than it has diversity

6   capability;

7   each member of a transmit uplink / receive downlink subset cannot

8   hold time and frequency coincident communications with any

9   other member of that transmit uplink / receive downlink subset;

10   and,

11   each member of a transmit downlink / receive uplink subset cannot

12   hold time and frequency coincident communications with any

13   other member of that transmit downlink / receive uplink subset;

14   transmitting, in said wireless electromagnetic communications network,

15   independent information from each node belonging to a first proper subset, to one

16   or more receiving nodes belonging to a second proper subset that are viewable

17   from the transmitting node;

18   processing independently, in said wireless electromagnetic communications

19   network, at each receiving node belonging to said second proper subset,

20   information transmitted from one or more nodes belonging to said first proper

21   subset;

22   and,

23   dynamically adapting the diversity capability means and said proper subsets to

24   optimize said network.

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27   2.   A method for optimizing a wireless electromagnetic communications network,

28   comprising:

29   a wireless electromagnetic communications network, comprising

30   a set of nodes, said set of nodes further comprising,

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1   at least a first subset wherein each node is MIMO-capable,

2   comprising:

3   a spatially diverse antennae array of M antennae, where M

4   ≥ two,

5   a transceiver for each antenna in said spatially diverse

6   antennae array,

7   means for digital signal processing to convert analog radio

8   signals into digital signals and digital signals into analog

9   radio signals,

10   means for coding and decoding data, symbols, and control

11   information into and from digital signals,

12   diversity capability means for transmission and reception of

13   said analog radiosignals,

14   and,

15   means for input and output from and to a non-radio

16   interface for digital signals;

17   said set of nodes being deployed according to design rules that prefer

18   meeting the following criteria:

19   said set of nodes further comprising two or more proper subsets of

20   nodes, with a first proper subset being the transmit uplink / receive

21   downlink set, and a second proper subset being the transmit

22   downlink / receive uplink set;

23   each node in said set of nodes belonging to no more transmitting

24   uplink or receiving uplink subsets than it has diversity capability

25   means;

26   each node in a transmit uplink / receive downlink subset has no

27   more nodes with which it will hold time and frequency coincident

28   communications in its field of view, than it has diversity

29   capability;

30   each node in a transmit downlink / receive uplink subset has no

31   more nodes with which it will hold time and frequency coincident

3

1   communications in its field of view, than it has diversity

2   capability;

3   each member of a transmit uplink / receive downlink subset cannot

4   hold time and frequency coincident communications with any

5   other member of that transmit uplink / receive downlink subset;

6   and,

7   each member of a transmit downlink / receive uplink subset cannot

8   hold time and frequency coincident communications with any

9   other member of that transmit downlink / receive uplink subset;

10   transmitting, in said wireless electromagnetic communications network,

11   independent information from each node belonging to a first proper subset, to one

12   or more receiving nodes belonging to a second proper subset that are viewable

13   from the transmitting node;

14   processing independently, in said wireless electromagnetic communications

15   network, at each receiving node belonging to said second proper subset,

16   information transmitted from one or more nodes belonging to said first proper

17   subset;

18   and,

19   dynamically adapting the diversity capability means and said proper subsets to

20   optimize said network.

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24   3.   A method as in claim 1, wherein dynamically adapting the diversity channels and

25   said proper subsets to optimize said network further comprises:

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27   using substantive null steering to minimize SINR between nodes transmitting and

28   receiving information.

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30   4.   A method as in claim 1, wherein dynamically adapting the diversity channels and

31   said proper subsets to optimize said network further comprises:

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